

ABSTRACT OF THE DISCLOSURE

A semiconductor chip cooling system having a body that forms an enclosed spray chamber, and having a thermal-transmittance wall configured to conformingly adjoin to a chip, a substrate or printed circuit board carrying one or more chips, or another such heated device. Inkjet-type sprayers are configured to spray cooling fluid on the thermal-transmittance wall to cool the chip. A controller transmits a control signal to the sprayer to cause the sprayer to spray at a rate leading to the cooling fluid being vaporized by the semiconductor device without the device either drying or becoming covered by a pool. The cooling system uses cooling fluid surface tension forces to draw liquid cooling fluid up a porous member from the spray chamber back to the sprayers, to be sprayed again. The cooling system uses gravity and/or pressure within the spray chamber to direct vaporized cooling fluid upward from the spray chamber to a condenser. The condenser is configured to cool and condense the vapor. A reservoir is positioned below the condenser and above the sprayers so as to receive condensed vapor from the condenser and feed it to the sprayers.